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Inventory of Public Land in Ahmedabad, Gujarat, India

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Abstract

This paper pilots an approach to identifying, categorizing, and mapping public land owned by the central, state, and local government in urban developed areas of Ahmedabad, Gujarat, India. The methodology uses information on plot sizes, location, and ownership that is publicly available for all areas covered by town planning schemes. The study examines the extent of unutilized and underutilized public land, which excludes all cemeteries, parks and gardens, heritage buildings, slums, utilities, infrastructure land, and industrial estates. Unused land already earmarked for public purposes were also excluded from the valuation exercise. The potentially marketable land so identified was valued at both official rates and estimated market rates. The value of potentially marketable excess land is significant—in per capita terms, the high-value scenario substantially exceeds the estimate of total infrastructure investment needs for the next 20 years prepared by an expert committee of the Ministry of Urban Development of the Government of India.

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Produced by the Research Support Team

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Keywords: Urban land, Land Policy in India, Urban Infrastructure, Infrastructure finance

JEL Classification: R53 Public Investment and Capital Stock, R14 - Land Use Patterns, R38 - Government Policy; Regulatory Policy

Sector Board: URBAN

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ACRONYMS

AMC Ahmedabad Municipal Corporation

AUDA Ahmedabad Urban Development Authority

BRTS Bus Rapid Transit System

CBD Central Business District

FSI Floor Space Index allowable on given plot, Index is calculated as the ratio of built floor area divided by the total plot area.

GIS Geographic Information System

HPEC High Powered Expert Committee

IDF India Development Foundation

TPS Town Planning Scheme

Inventory of Public Land in Ahmedabad, Gujarat, India

1 Introduction

The urgent need for substantially augmenting financial resources required for investing in urban infrastructure is well recognized.[1] Monetizing public land assets could contribute a substantial share of funds needed, as international experience has shown in other countries.[2] The 13th Finance Commission of India has underlined the importance of ensuring proper use of land held by governments, central, state and local as well as government-owned Public Sector Undertakings.[3] The Committee on Fiscal Consolidation has noted that there is considerable potential given the underutilized prime land of Public Sector Undertakings, Port Trusts, and Railways, etc. For realizing such potential, the Committee has considered it as a part of disinvestment and has recommended setting up of a group to work out the policy framework and institutional modalities.[4]

The High Power Expert Committee (HPEC) has also recognized that monetizing underutilized public land can be a source of generating finances. The Committee has called for judicious and transparent use of the instrument of unlocking land value and has recommended that the following steps be taken before the 'sale of land' is used as an instrument for financing urban infrastructure:

- "A systematic city-wide inventory of land assets must be made to be able to identify core and non-core land assets, and proposing the best use of public land assets must be part of comprehensive planning for the city.
- A transparent and accountable mechanism for sale of public land must be put in place.
- Proceeds from land sales must be used only for capital investment projects/housing for the poor via creation of a 'Land Capital Fund' whose governance and operational mechanisms are designed in such a manner as to ensure total transparency.
- A mechanism for sharing revenues between the public agency owning the land and the infrastructure development agency must be established."[5]

The World Bank and PPIAF, in collaboration with the India Development

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[1] High Power Expert Committee (HPEC): *Report on Indian Urban Infrastructure and Services* March 2011

[2] George Peterson: *Unlocking Land Values to Finance Urban Infrastructure*. The World Bank Public Private Infrastructure Advisory Facility, Washington D.C. 2009

[3] *Report of the 13th Finance Commission 2010-2015, Volume I* December 2009

[4] *Report of the Committee on Fiscal Consolidation, Ministry of Finance, Government of India* www.finmin.nic.in

[5] HPEC *op.cit.*

Foundation (IDF) have agreed to provide support for a consultative process *inter alia* to examine unlocking the value of public land particularly for financing urban infrastructure in India. In this context, it is considered desirable to have an inventory of public land in Ahmedabad and estimation of the value of potentially marketable land. The present study—Inventory of Public Land in Ahmedabad Municipal Corporation—is a part of this effort.

2 Methodology, Data Sources and Analysis

2.1 Study Area

For the purposes of this study, we have examined the jurisdiction of the Ahmedabad Municipal Corporation prior to its extension in 2006. We have done this because this area covers the currently developed areas of the city, which are most relevant to the question at hand, that is, understanding the extent, ownership, locations and potential value of public land in the developed area of this major urban area[6]. Ahmedabad has not been selected because it is especially representative of all urban areas nor is such a city likely to exist. This study is meant to pilot an approach and methodology for shedding light on these important questions, which could then be explored in their own right in many cities in India and elsewhere. The study area, in the context of the present day jurisdiction of Ahmedabad Municipal Corporation (AMC) and Ahmedabad Urban Development Authority (AUDA), is shown in Figure 1 and its relationships to the respective jurisdictions are shown in Table 1.

[6] It could also be very useful to study public land holdings in the full extended AMC and also in rural areas. To keep the scope of this pilot intended to demonstrate the use of a specific methodology for inventorying public lands in the absence of a full-fledged government supported land inventory, we limited our analysis to the developed area of the AMC.

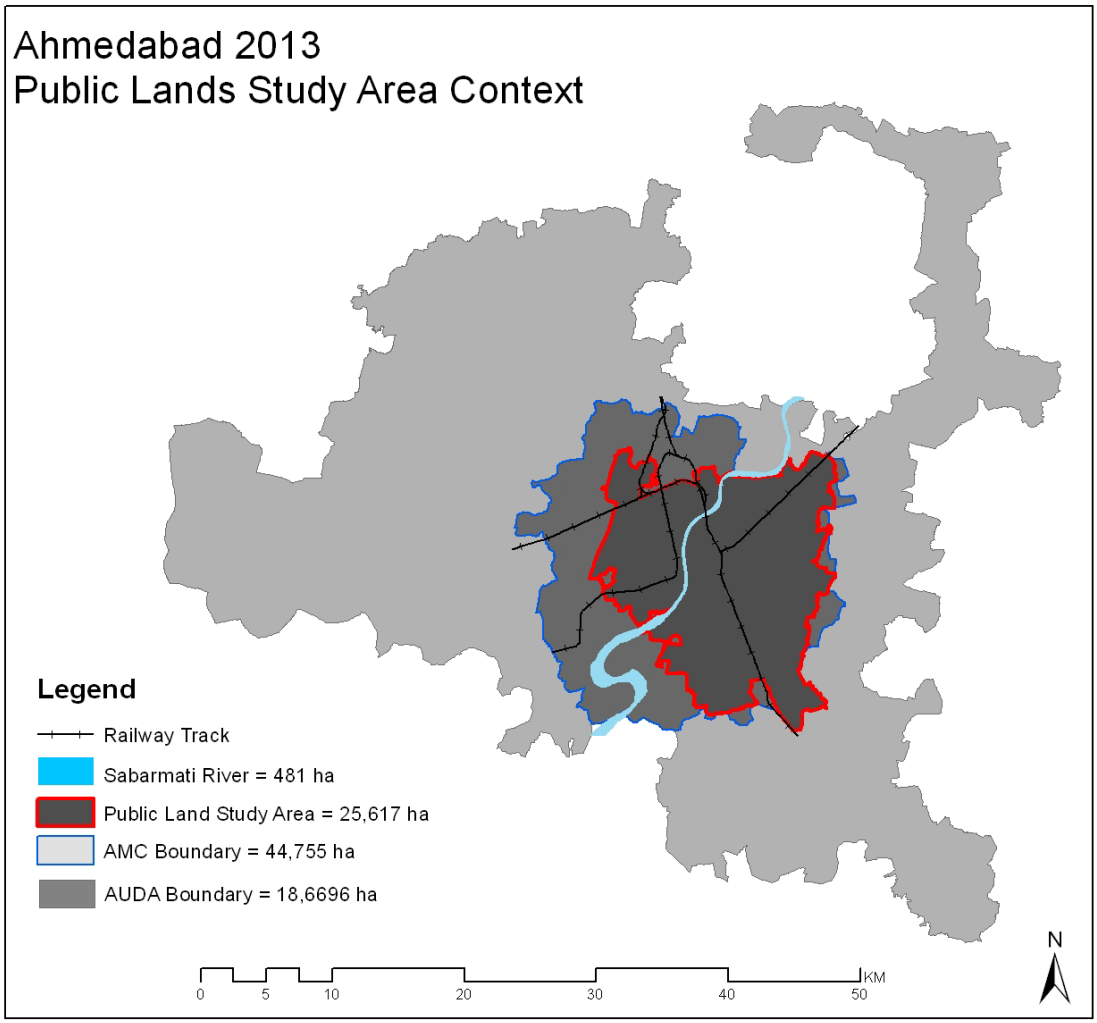


Figure 1: Context of the Study Area

No	Details	Area (Sq. Km)
1	Ahmedabad Urban Development Authority(AUDA)	1866
2	Ahmedabad Municipal Corporation (AMC)	447
3	Study Area	256

Table 1: Extent of the Study Area and its Surroundings

AUDA is responsible for preparing the statutory Development Plan for the area of AMC and its peri urban areas that are likely to urbanize in the near future. It also undertakes Town Planning Schemes (TPS) in areas outside the AMC jurisdiction and would therefore appropriate land in the public domain. As the approach to utilizing public land piloted in this study would be also relevant in the larger context of the city region, the study area in the context of AUDA is also noted above.

2.2 Preparing the GIS Database

This comprehensive study for Ahmedabad is one of the first to use the Geographic Information System (GIS) to make an inventory of public land. Ahmedabad has, through a single source of TPS,[7] authentic maps and ownership data of all the Final Plots.[8] The technology of Computer Aided Design software (AutoCAD Map 3D) was used to digitize the original TPS paper maps.

In a second step, these digital maps were overlaid on recent Ahmedabad Google Earth images from 2010. Maps were geo-coded (projection WGS_1984_UTM_Zone_43N) for a correct reading of latitude and longitude. This process permitted greater accuracy in registering the exact location of land owned by the Central Government, State Government and Ahmedabad Municipal Corporation (AMC).

To conduct such analysis, the data were extracted from GIS shape files listed below:

AMC Boundary	Railway	Railway Track
Buffer Ring	Roads	Major Roads
FP Boundary	Sabarmati River	BRTS
Canal	Study Area	Metro Phase 1
Gamtal	TPS Boundary	Metro Phase 2
GIDC Boundary	Walled City	

In Annex II there is a listing of the GIS database "FP Boundary" for the field name abbreviations and their exact contents. Resulting data analysis is presented in succeeding sections.

[7] Ballaney, Shirley: *The Town Planning Mechanism in Gujarat, India,* World Bank Institute Washington DC, 2008.

[8] Town Planning Schemes, as documented in Shirley Ballaney op.cit. and elsewhere are a form of land pooling which has been used in many countries throughout the world.. Town Planning Scheme is a plot reconstitution scheme in which Original plots (OP) are reconstituted into Final Plots (FP) after appropriating land for roads and other public amenities.

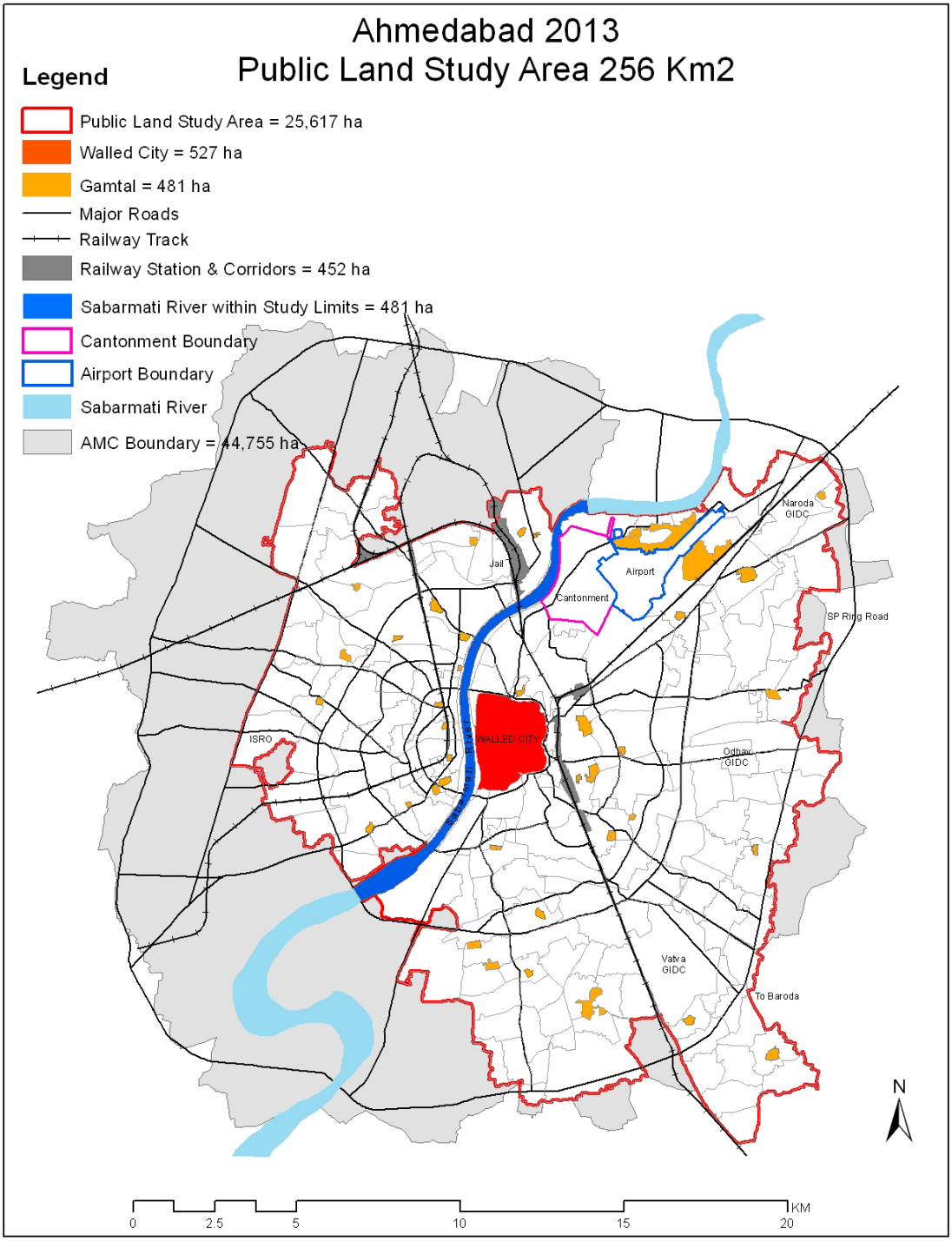


Figure 2: Study Area

2.3 Identifying Public Land for the Study

Whether a plot of land is public or private cannot be decided by ownership alone. The nature and extent of rights attached to the land also have to be taken into account. Thus there is a continuum of property rights in land ranging from private freehold to unencumbered public land. This is illustrated in Figure 3.

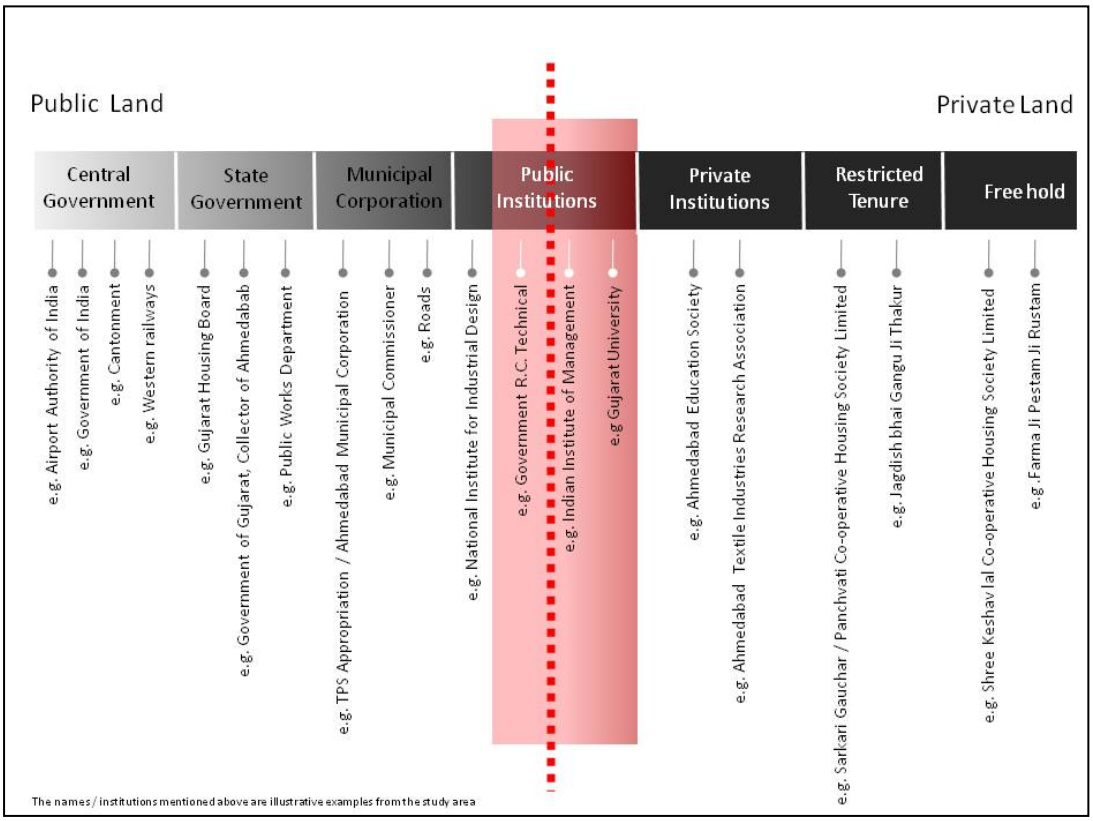


Figure 3: Continuum of Land Rights

For the purpose of the present study, a section of this continuum, shown to the left of the red dotted line in Figure 3, is considered as 'public'.

Land under roads, railways, rivers and water bodies is obviously public. Accordingly, the area of such land is calculated from the GIS database. In many cities, railways have land that is sub-optimally used. In Ahmedabad, as seen from the maps, railways have land narrowly confined along the tracks with some extension at stations. Railway land accounts for only 1.76 % of the study area[9]. (However railways act as barriers that are difficult to cross.) Similarly, roads account for only 12 % of the study area, which is rather modest as compared to cities of similar size. (Please see Table 2.) The land under roads, railways, river and water bodies, though public, is not considered for further analysis in this study, particularly since it has little relevance for revenue potential.

In Ahmedabad the Walled City is the original settlement around which the city has gown. In this process the original village settlements—Gamtals—have been engulfed by urban expansion. The TPS data identified Gamtals and the Walled City

[9] Other cities may have more extensive railway land holdings that may not be fully used as in the case of Ahmedabad. Also even for a city such as Ahmedabad, managing these lands as separate from the city may have costs and cooperative arrangements between city administration and the railways or other public lands could have benefits. Slums on railway lands cannot be provided with basic public health services and it can be very difficult to obtain any type of right of way to cross or overpass rights of way or swap lands to allow road building. These are among the potential costs of fragmented and uncooperative management of public lands. Our mapping and inventorying exercise helps highlight where these conflicts can occur.

as clusters of land holdings without separately identifying individual holdings. There might be some public land in Gamtals and Walled City but it has not been covered in this study, due to lack of readily available data and the fact that such public land is likely to be small and already committed to local community use having very little market potential if any. Walled City and Gamtals that together account for only 3.94 % of the study area are therefore treated as entirely private.

The basic property rights records and records of rights over land are maintained by the Revenue Department of the State Government. These are amended once the Town Planning Scheme is sanctioned. Since TPS provide map-based records of ownership, in the present study wherever TPS are available they have been used as the source of data for public land. In non-TPS areas the extracts from the record of rights from the Revenue Department have been used. (These are called 7/12 extracts.) Thus public land and its use in the study area were identified by using following data sources and survey methods:

(a) Public land indicated on maps and data of TPS,
(b) In case of non- TPS areas, cadastral records (called 7/12 extracts of record of rights) were used to identify public land.
(c) The use of such public land, including the public agency that owns the land, was identified through field surveys.

These details were then incorporated in the GIS database. Based on the shape files in GIS, a geographical distribution of public land owned by Central Government and State Government is derived and shown Figure 4.

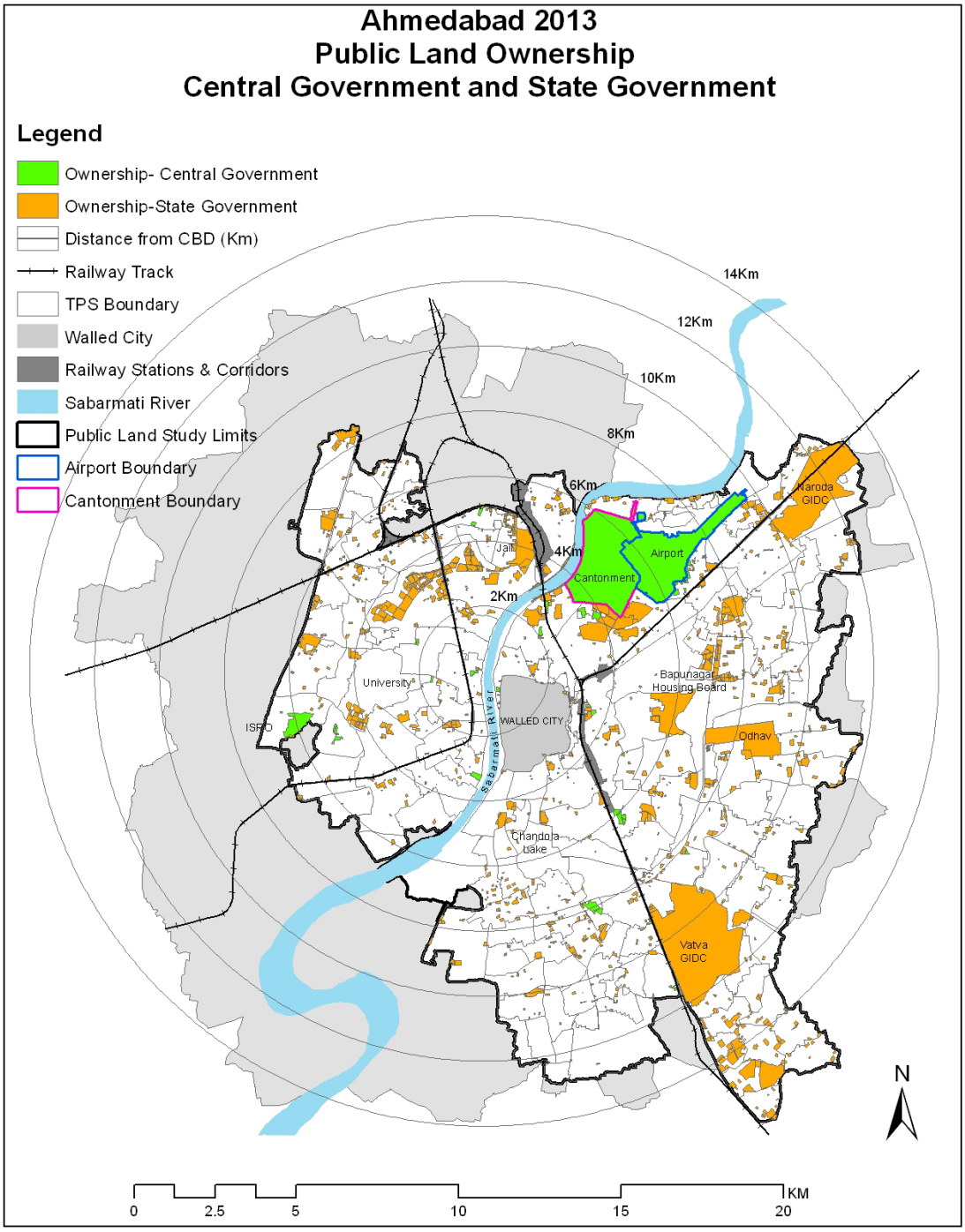


Figure 4: Public Land Owned by Central and State Governments

Because the Municipal Corporation appropriates land through TPS, the redevelopment of Mill Land, and the development of land in the Green Belt, its public land holdings are widely distributed and in many cases, take the form of small plots. In case of textile mills, the land appropriation only occurs at the time of redevelopment of mill land. The exact location and boundaries of such land are not known at this stage. These are therefore depicted as circles on the map. The geographical distribution of public land owned by the Municipal Corporation is shown in Figure 5.

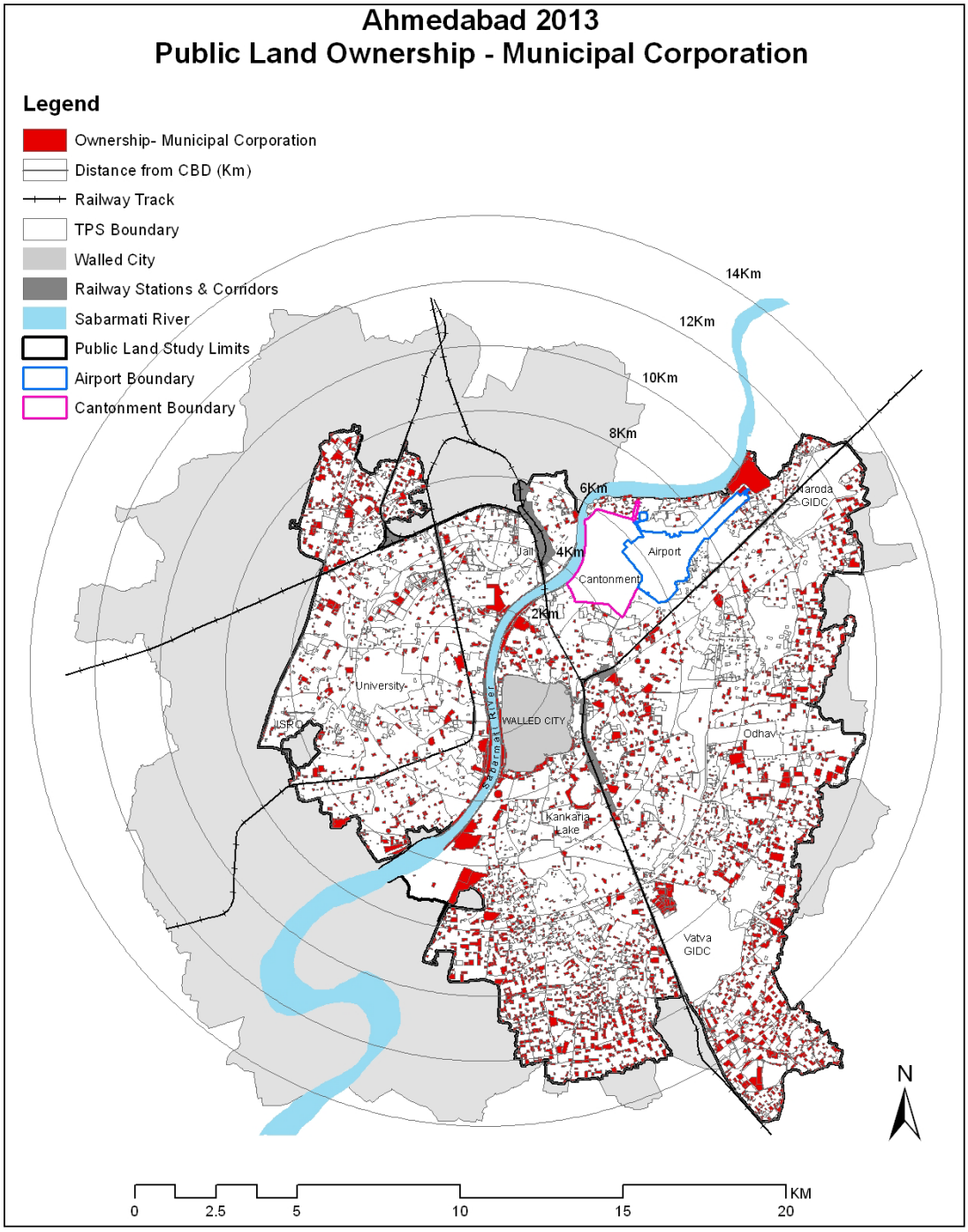


Figure 5: Public Land Owned by the Municipal Corporation

The breakdown of total land in Ahmedabad - public and private - in the study area is shown in Table 2.

Total Study Area					
Ownership	**No. of Plots**	**Area (Ha)**	**% of Public Land**	**% of Developable Land**	**% of Study Area**
PUBLIC LAND					
Municipal Corporation	4735	3,102.48	28%	15%	12.11%
State Government	1425	2,746.09	24%	13%	10.72%
Central Government	80	1,001.59	9%	5%	3.91%
Sub Total	**6240**	**6,850.16**	**61%**	**32%**	**26.74%**
Roads		3,111.80	28%		12.15%
Sabarmati River		480.47	4%		1.88%
Other Water Bodies		346.64	3%		1.35%
Railways		452.02	4%		1.76%
Sub Total		**4,390.93**	**39%**		**17.14%**
Total Public Land		**11,241.09**	**100%**		**43.88%**
PRIVATE LAND					
Private land parcles		13,317.60		63%	51.99%
Walled City		577.42		3%	2.25%
Gamtals (Village Sites)		481.19		2%	1.88%
Total Private		**14,376.21**		**68%**	**56.12%**
TOTAL STUDY AREA		**25,617.30**			**100.00%**

Table 2: Public and Private Land in Study Area

The above data are presented in graphical form in Figure 6.

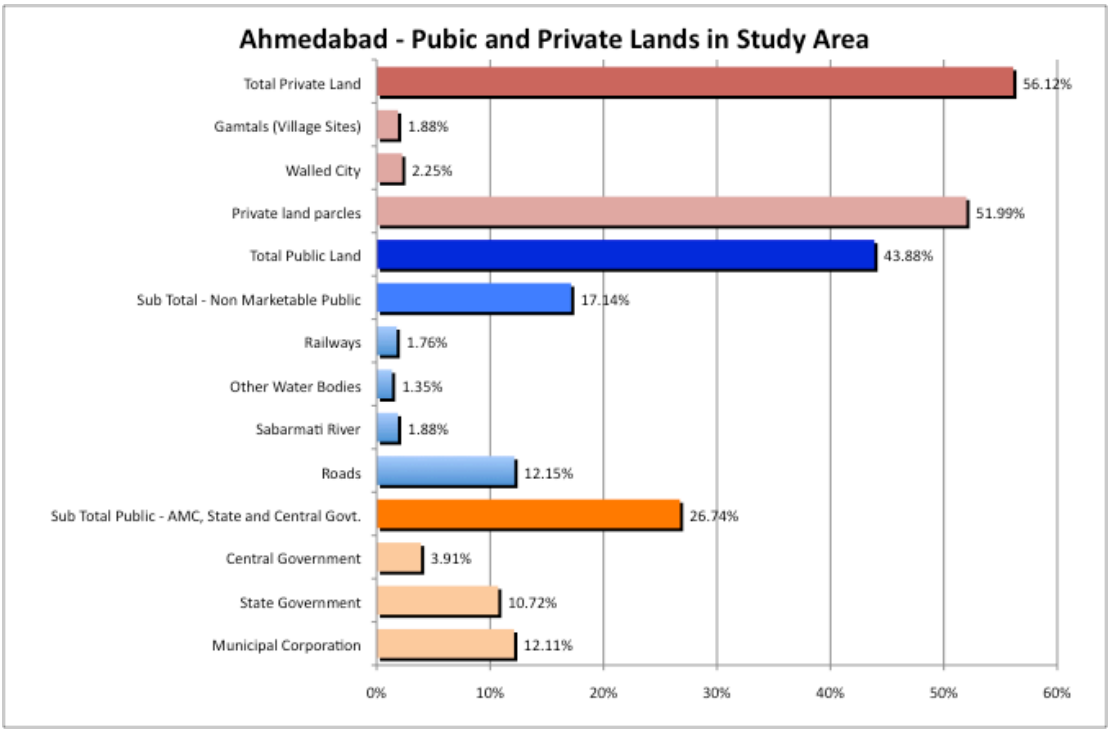


Figure 6: Public and Private Land in the Study Area

The Public Land has a total area of 11,241 hectares, corresponding to 44% of the land within the study limits. Out of this 4,390 (17% of study area) hectares are under roads, railways, rivers and water bodies. As explained earlier, these are excluded from the scope of further analysis. Thus the area of public land considered hereafter for the further analysis is 6,850 hectares. (Table 3). This represents 32 percent of all the developable/developed land within the city, with 68 percent or 14,376 hectares, available for private purposes within the study

area.

2.4 Use of Public Land

The use of public land based on the Development Plan, General Development Control Regulations and the Field Surveys was incorporated in the shape files of the GIS database. Figure 7 shows the geographical distribution of public land by use.

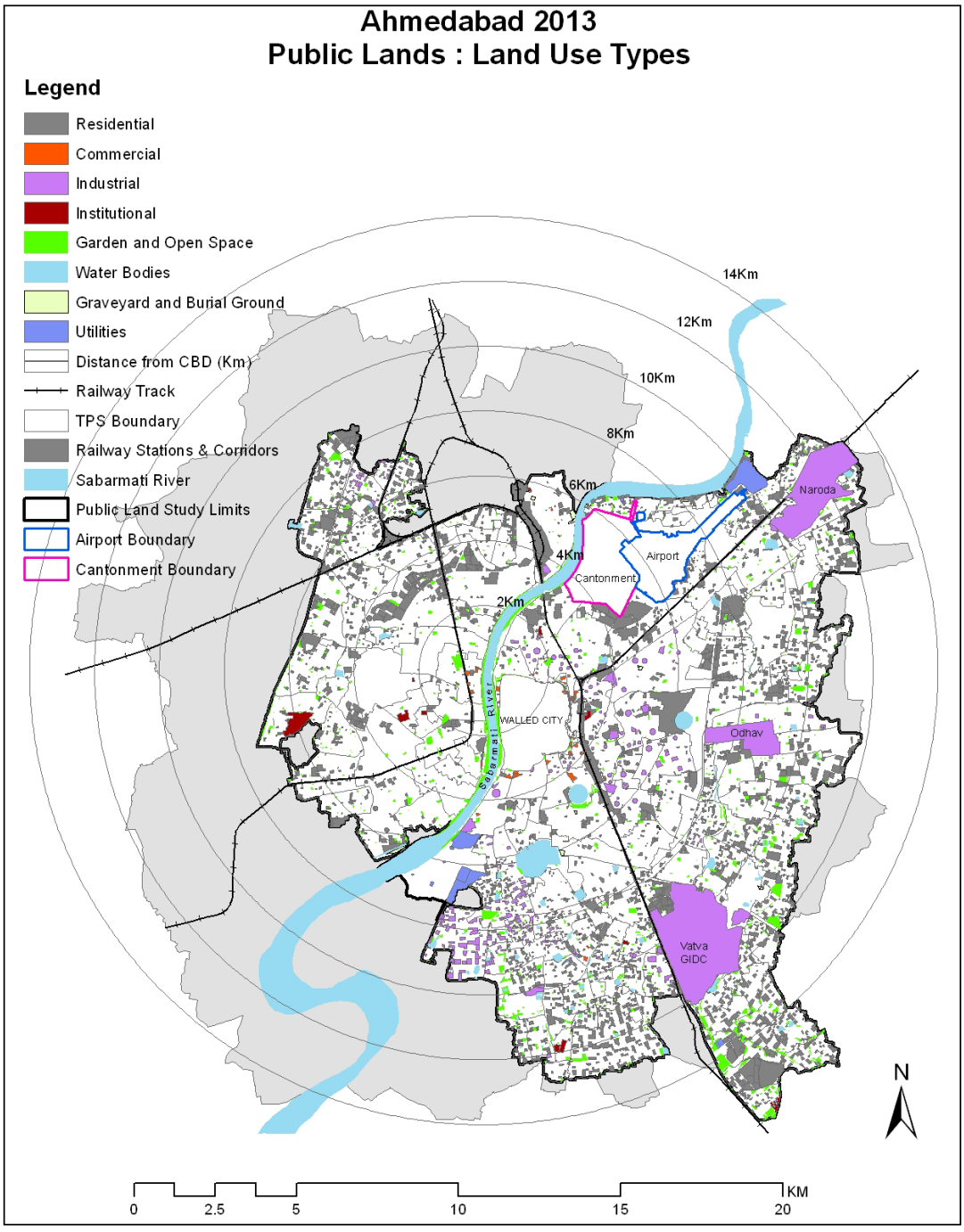


Figure 7: Public Land - Land Use Types

In Figure 7, the Public Land has been registered according to different land use types. Most of the large areas classified as "**Residential**" are owned by the Gujarat

Housing Board and are located between 3 and 7 kilometers from the city center. Vacant land in this development in the North West of Ahmedabad was part of the former green belt that once limited the expansion of the city. (See Google Earth images presented in Annex I.)

Smaller land parcels also classified as "**Residential**" are mainly distributed within the 8km to 14km circles (distance from the Central Business District (CBD)), particularly in the South East of Ahmedabad at proximity to the large industrial estates owned by the State Government and the Municipal Corporation. (See Google Earth images presented in Annex I.)

Land use types for Public Land are listed below in Table 3.

INVENTORY OF PUBLIC LANDS - AHMEDABAD 2013
CLASSIFICATION BY OWNERSHIP AND LAND USE TYPES

Land use Types	Public Lands Ownership						Grand Total Public Lands		% of Total Study Limits
	Municipal Corporation		State Government		Central Government				
	Plot Nb.	Area (ha)	Plot Nb.	Area (ha)	Plot Nb.	Area (ha)	Plot Nb.	Area (ha)	
Residential	2370	1,579.15	1060	1,298.77	60	60.18	3490	2938	42.89%
		53.75%		44.20%		2.05%		100%	
Industry (general+special)	394	291.09	87	1,200.22	3	0.72	484	1492	21.78%
		19.51%		80.44%		0.05%		100%	
Commerce	90	29.63	122	8.78	7	2.89	219	41	0.60%
		71.74%		21.27%		6.99%		100%	
Institution: Education, Health Research ISRO	17	17.16	7	15.69	2	38.34	26	71	1.04%
		24.10%		22.04%		53.86%		100%	
Service	13	13.33	3	3.91	0	0.00	16	17	0.25%
		77.33%		22.67%		0.00%		100%	
Utility: Treatment Plant	10	154.73	1	3.24	0	0.00	11	158	2.31%
		97.95%		2.05%		0.00%		100%	
Park, Open Space+Recreational Agriculture, Forest	1129	601.37	63	47.72	3	0.59	1195	650	9.48%
		92.56%		7.34%		0.09%		100%	
Cemetery	13	14.42	11	5.54	0	0.00	24	20	0.29%
		72.26%		27.74%		0.00%		100%	
Airport	0	0.00	0	0.00	1	402.74	1	402.74	5.88%
		0.00%		0.00%		100.00%		100%	
Cantonment	0	0.00	0	0.00	1	483.91	1	483.91	7.06%
		0.00%		0.00%		100.00%		100%	
Wholesale market	1	0.43	0	0.00	0	0.00	1	0.43	0.01%
		100.00%		0.00%		0.00%		100%	
Other, Multi-Purpose	105	59.23	22	17.24	0	0.00	127	76.47	1.12%
		77.45%		22.55%		0.00%		100%	
NA, No Defined Use	593	341.00	49	146.00	3	12.22	645	499.22	7.29%
		68.31%		29.25%		2.45%		100%	
GRAND TOTAL PUBLIC LANDS BY OWNERSHIP	4735	3,102	1425	2,747	80	1,002	6240	6,850	100%
		45%		40%		15%		100%	

Table 3: Land Use of Public Land

Land use type **Residential** represents 42% of the total registered Public Land. Plots mainly owned by the Municipal Corporation (54%) and State Government (44%) make up this category.

Land use type **Industry (general + special)**, areas originally classified as "General Industry" and "Special Industry", both were added and correspond to 22% of the total public land. The State Government owns 80% and the Municipal Corporation 20% of such land.

The former Textile Mills will be redeveloped and 61 ha (20% of these parcels) will be in the possession of the Municipal Corporation for public uses. See Table 4, Figure 8 and map Figure 10 where these areas are represented by a series of circles.

The Airport and the Cantonment have an area of 403 Ha and 484 Ha respectively, and together account for 11.5% of the public land.

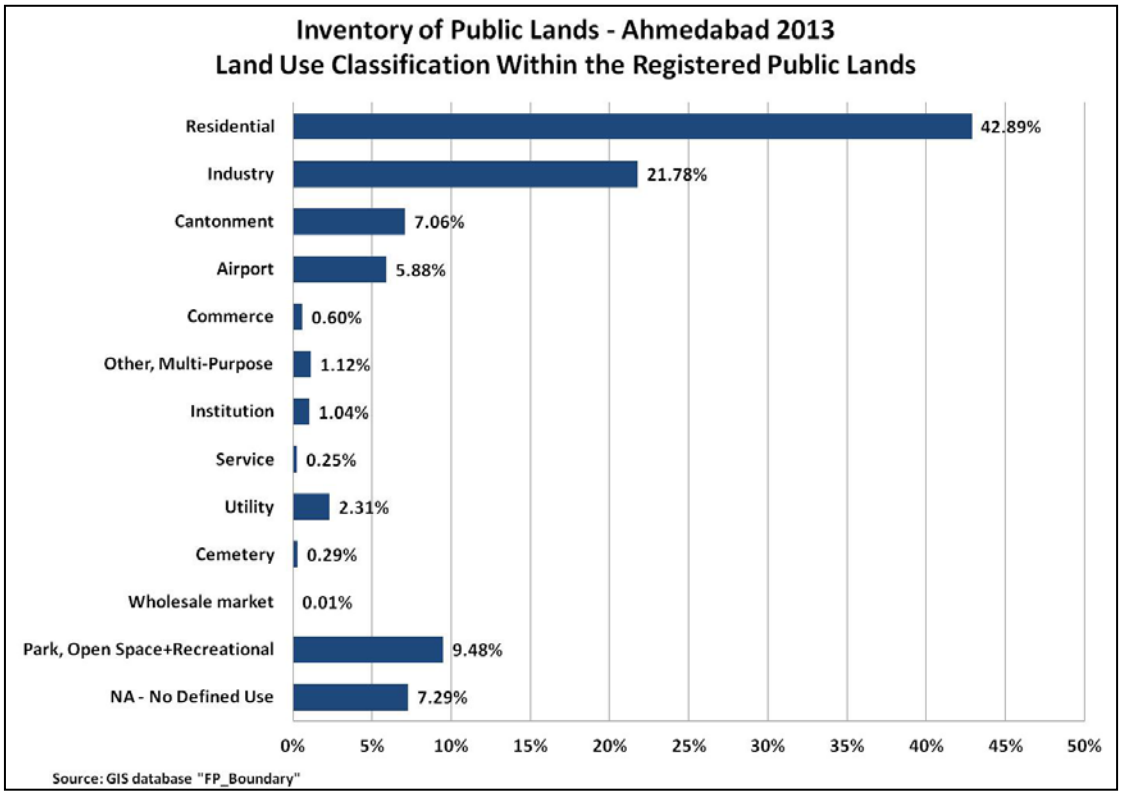


Figure 8: Land Use Classification within the Public Land

2.5 Identifying Potentially Marketable Public Land

The use of public land ranges from infrastructure like roads, which must remain dedicated to this use and hence are not potentially marketable, to vacant land that could be made available for development without any encumbrance. Figure 9 shows such a range.

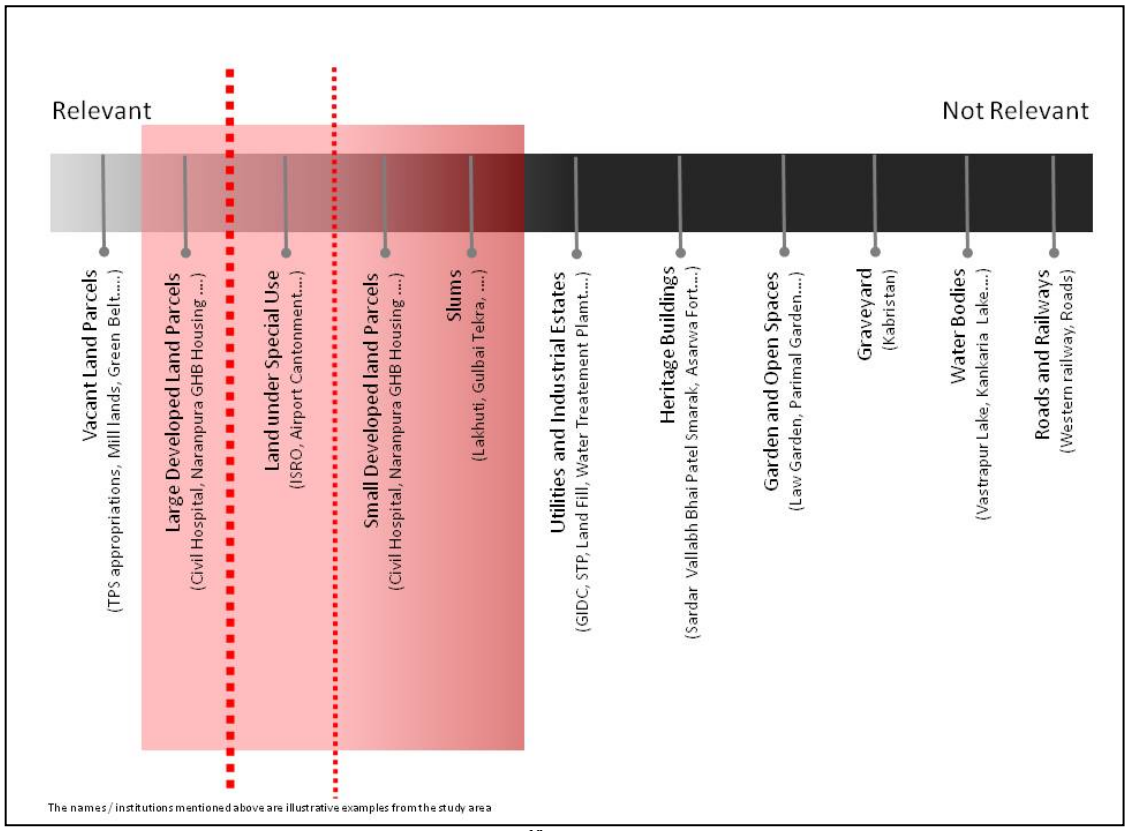


Figure 9: Potentially Marketable Public Land[10]

Public land that is used as cemeteries, gardens and open spaces, plots having heritage buildings and plots having functioning utilities obviously are not considered marketable for the purpose of this study. Industrial estates initially owned by the state agency – Gujarat Industrial Development Corporation (GIDC) are now leased to individual factories and therefore not considered potentially marketable for the purpose of this study[11]. It may however be noted that lease rents initially fixed at lower rates could be revised to near market rates to

[10] In this study, we used a very conservative methodology for identifying lands with potential to be marketed. We underscore however that the findings should not be interpreted as a recommendation that such lands should be marketed and monetized. That would have to be a decision of the respective government. This study is intended to provide information that would be of use to decision makers about the potential of a strategy to manage public land assets more proactively. Hereafter in the text, all references to marketable land should be understood to mean potentially marketable lands.

[11] A fully fledged examination of the revenue potential for public lands should include an examination of public lands such as these allocated to third parties. Leases could be examined to to determine if they are in line with market rates or if they are in need of adjustment. George Peterson and Vasudha Thawakar "Capturing The Value Of Public Land For Urban Infrastructure: Centrally Controlled Landholdings" forthcoming World Bank, have shown that leases of port lands have not necessarily reflected the market value of the lands leased to private parties, and in some notable cases, they are below market rates by a large margin. In the case of long term leases with annual payments, it has been quite difficult to maintain rates that reflect the market value of land used even for purely private purpose. Such an analysis demands a very different methodology. Terminating those leases or selling those lands under lease could also be quite involved. In the spirit of providing a conservative estimate, the value of such lands has been left out of the scope of this study. This does not mean however, that they do not have substantial value whether in Ahmedabad or in other cities.

become an important source of revenue. Public land that has slums is not included in the land that could be potentially marketable. The general Government of India policy regarding slums is to improve them in situ and also transfer property rights to existing slum dwellers.[12] Though it might be possible to realize the value of public land in selected cases by relocating slums, in practice it would not to be desirable. Indeed the slums provide an important share of well-located low-income housing that would be very difficult to replace. Moreover, slums on public land occupy a very small portion of public land under study, only 4 percent. Yet they house close to 400,000 people or 20 percent of the total estimated population in slums and chawls in Ahmedabad.[13]

In Ahmedabad, private land is appropriated by public agencies in three different ways. These are:

(a) In TPS, besides the land required for roads, open spaces and social amenities, land can be appropriated for housing for 'socially and economically weaker sections' and 'commercial sale' to augment the finances of planning agency.
(b) In the first Development Plan of Ahmedabad, there was a Green Belt in which no development was possible. In the second Development Plan, the Green Belt was brought into the development zone and detailed reservations of land for public purposes were identified and were supposed to have been compulsorily acquired. Realizing that such acquisition is not possible the Development Plan that followed deleted the reservations and opted for including such land in TPS. Until the TPS is completed, private landowners were permitted to develop their land subject to the condition that 50% of the land must be surrendered to the planning agency. Out of this, 20% is considered potentially marketable with 30% required for provision of roads and public services.
(c) General Development Control Regulations have made a special provision for the redevelopment of land of closed textile mills. According to this provision, 20% of the plot area has to be contributed for provision of public amenities / public purpose. The regulation further asserts that land so obtained shall not be used for purposes other than for public uses and public amenities.[14] Under the conservative approach we have used in this study, we did not consider such land as potentially marketable for assessing revenue potential.

[12] Policies under the Rajiv Awas Yojana of the Ministry of Housing and Urban Poverty Alleviation, Government of India

[13] Annez et alia (2012) estimate density in slums at 1230 persons per hectare and the total population in slums and chawls as 1,880,300 persons. Accordingly the 315 hectares of identified public slum lands can be estimated to account for roughly 20 percent of the total slum population in greater Ahmedabad.

[14] Regulation 10.10.1 of the General Development Control Regulations 2002, as amended till 2004, AUDA

2.6 Extent of Potentially Marketable Public Land

The Airport and Cantonment represent a large amount of Central Government land. The total area of the Airport is 403 hectares. Considerable area is used for runways, taxiways, aprons, terminals and other aviation infrastructure. Nevertheless 35 hectares of land in five pockets could be identified as possibly available for monetizing. The Cantonment has a total area of 484 hectares. Out of this 36 Ha are under roads including roads leading to Airport. Of the remaining area, 81 Ha is developed as parks, 93 Ha is vacant and 273 Ha is developed with scattered buildings of ground floor or two story buildings. The total footprint area of the buildings in this area is around 40 Ha. In the absence of information of the activities supported by these buildings and safety requirements if any[15], it is assumed that if reorganized, these existing buildings could be accommodated on 50% of 273 Ha. Thus the total potentially marketable land in the Cantonment is estimated as about 230 Ha. (93+273/2). In addition to this Indian Space Research Organization (ISRO) is also located on 36 Ha of Central Government Land. Given the specialized nature of its activities it is assumed that, for the purpose of this initial pilot study, ISRO has no surplus land that could be monetized. That assumption could be revisited based on an analysis of the ISRO functions and needs. Since this area is well-located, such an analysis could be worthwhile.

In the case of other land, all vacant public land irrespective of the area of individual plots is considered as potentially marketable. Plots with existing buildings having an area of less than 1 hectare are not considered as marketable. The extent of potentially marketable area in case of large plots, more than 1 hectare in area, having existing buildings was assessed by two alternative methods described below.

It should be noted that of all public land (6,850 ha), close to 52% is not marketable, 21% is vacant land and 31% is developed with construction at different levels of consumed FSI. Vacant land including TPS appropriations represents 20.73% of the total public land and 43% of the total Potentially Marketable Land. Table 4, Figure 10 and Figure 11 show the extent of potentially marketable and non-marketable areas according to ownership and land categories.

[15] Our method in the study area outside the cantonment involved site visits to validate actual built FSI. As access to the cantonment was not open to the general public, we had to use a rougher method. This estimate could easily be refined with access to the cantonment area.

INVENTORY OF PUBLIC LANDS - AHMEDABAD
CLASSIFICATION BY OWNERSHIP AND MARKETABILITY

Marketability	Public Land by Ownership			Total Public Lands	
	Municipal Corporation	State Government	Central Government		
10000	Area (ha)	Area (ha)	Area (ha)	Area (ha)	% of Total
Marketable lands					
Vacant Public Land					
Public land incl. TPS Appropria	1183	234	3	1420	20.73%
	83%	*16%*	*0%*	*100%*	
20% of Green Belt lands	62	0	0	62	0.91%
	100%	*0%*	*0%*	*100%*	
Developed public land					
Obsolete use	15	0	0	15	0.22%
	100%	*0%*	*0%*	*100%*	
Consumed FSI <45%	303	569	44	916	13.37%
	33%	*62%*	*5%*	*100%*	
45%<Consumed FSI <85%	99	324	6	428	6.26%
	23%	*76%*	*1%*	*100%*	
Consumed FSI >85%	36	141	4	181	2.65%
	20%	*78%*	*2%*	*100%*	
Airport - Marketable	0	0	35	35	0.51%
	0%	*0%*	*100%*	*100%*	
Cantonment - Marketable	0	0	230	230	3.35%
	0%	*0%*	*100%*	*100%*	
Total Marketable	**1699**	**1267**	**321**	**3288**	**47.99%**
	52%	*39%*	*10%*	*100%*	
Non Marketable Lands					
Cemeteries	14	6	0	19	0.28%
	71%	*29%*	*0%*	*100%*	
Garden/ Open Spaces	553	19	0	572	8.34%
	97%	*3%*	*0%*	*100%*	
Heritage Building	0	4	5	10	0.14%
	0%	*47%*	*53%*	*100%*	
Slums	217	97	2	315	4.60%
	69%	*31%*	*1%*	*100%*	
Utilities and Industrail Estates	155	1141	0	1295	18.91%
	12%	*88%*	*0%*	*100%*	
Small non-vacant plots <1 ha	404	213	15	631	9.22%
	64%	*34%*	*2%*	*100%*	
20% of Textile Mills' land	61	0	0	61	0.89%
	100%	*0%*	*0%*	*100%*	
Airport - Operational	0	0	368	368	5.37%
	0%	*0%*	*100%*	*100%*	
Cantonment - Operational	0	0	254	254	3.71%
	0%	*0%*	*100%*	*100%*	
Indian Space Reasearch Orgar	0	0	36	36	0.53%
	0%	*0%*	*100%*	*100%*	
Total Non-Marketable	**1403**	**1479**	**681**	**3563**	**52.01%**
	64%	*34%*	*2%*	*100%*	
Total Public Land	**3102**	**2746**	**1002**	**6850**	**100.00%**
	64%	*34%*	*2%*	*100%*	

Table 4: Marketability of Public Land by Ownership

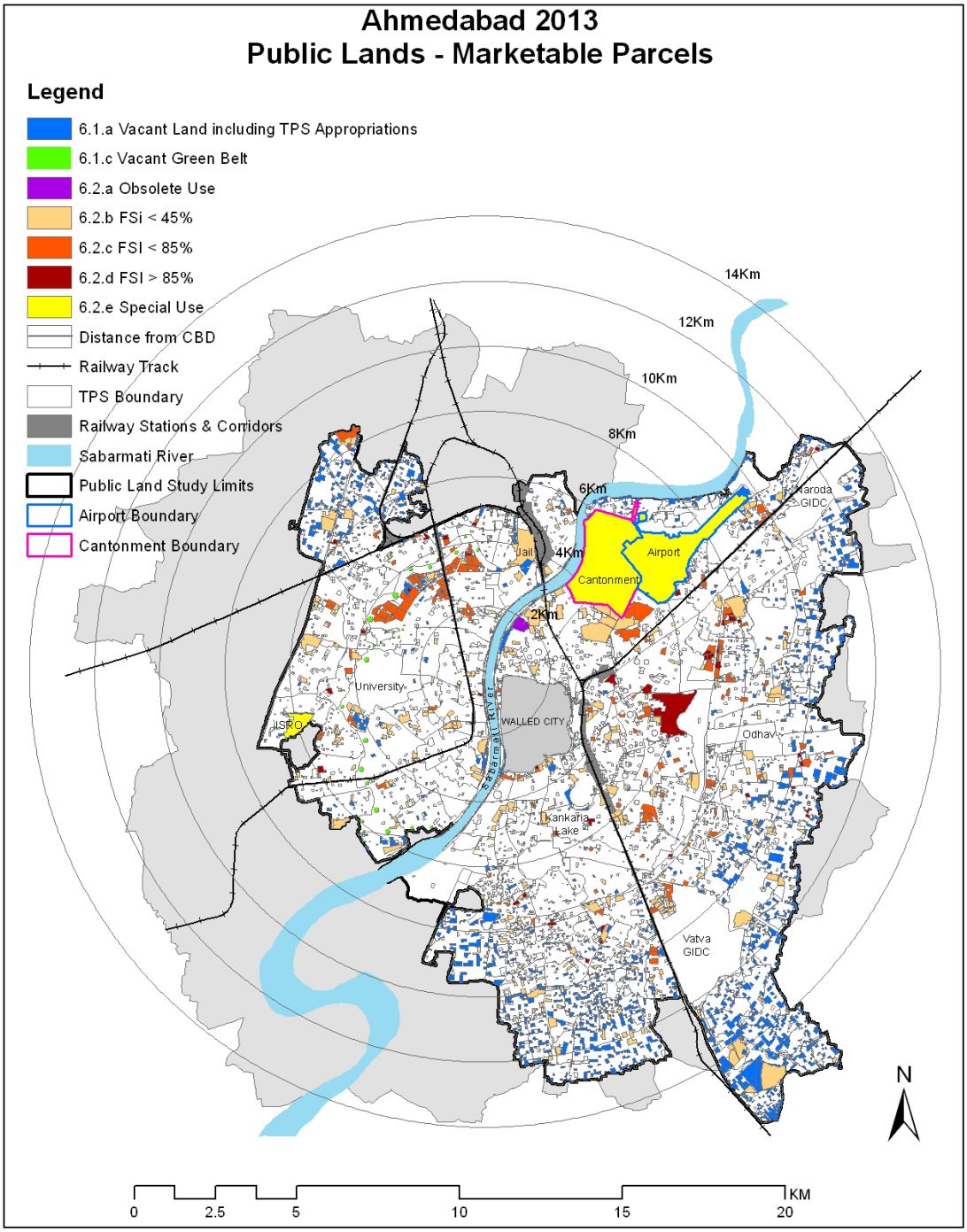


Figure 10: Potentially Marketable Public Land by Ownership

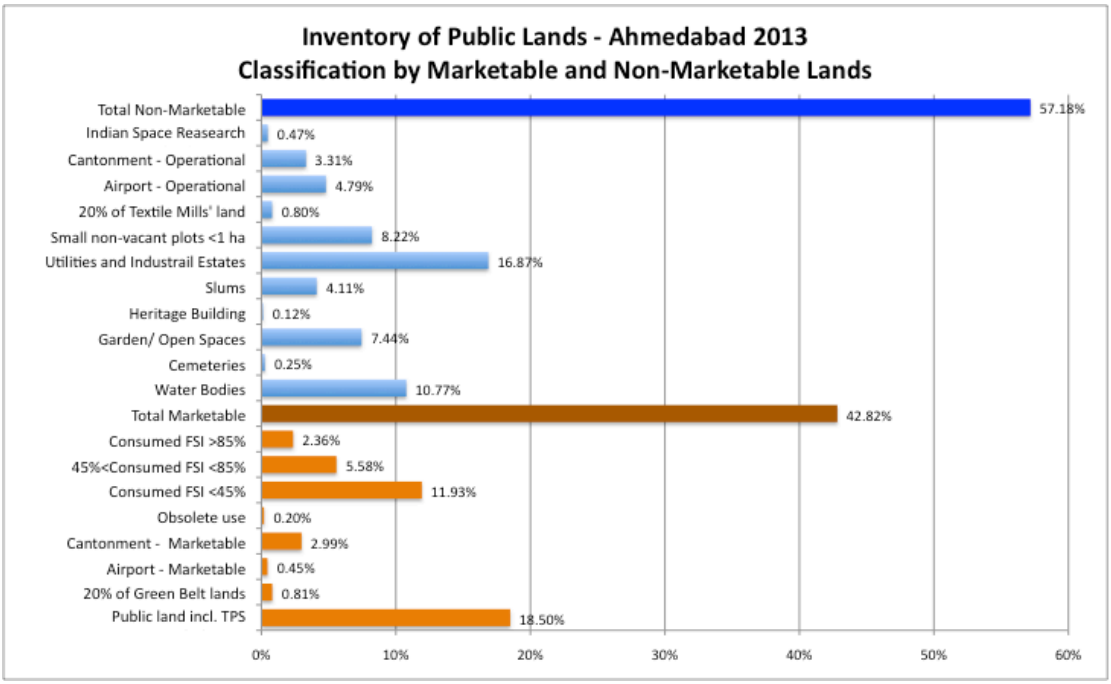

Inventory of Public Lands - Ahmedabad 2013
Classification by Marketable and Non-Marketable Lands
Total Non-Marketable
Indian Space Reasearch
Cantonment - Operational
Airport - Operational
20% of Textile Mills' land
Small non-vacant plots <1 ha
Utilities and Industrail Estates
Slums
Heritage Building
Garden/ Open Spaces
Cemeteries
Water Bodies
Total Marketable
Consumed FSI >85%
45%<Consumed FSI <85%
Consumed FSI <45%
Obsolete use
Cantonment - Marketable
Airport - Marketable
20% of Green Belt lands
Public land incl. TPS
57.18%
0.47%
3.31%
4.79%
0.80%
8.22%
16.87%
4.11%
0.12%
7.44%
0.25%
10.77%
42.82%
2.36%
5.58%
11.93%
0.20%
2.99%
0.45%
0.81%
18.50%
0%
10%
20%
30%
40%
50%
60%

Figure 11: Marketability of Public Land

2.7 Alternative Methods for Estimating Potentially Marketable Land in Partially Developed Land

Alternative I - Based on unused FSI:

Steps followed in this Alternative are described below:

(a) First the footprints of existing buildings were identified from the satellite imageries and then digitized in CAD.

(b) The number of floors for every building was noted from field surveys.

(c) The footprint multiplied by number of floors gave the floor area of every building and then the total floor area of buildings on the plot. (FA)

(d) This in turn gave the existing FSI in the form of ratio of floor area divided to the plot area (PA). (Existing FSI=FA/PA). However this is not directly comparable to the FSI prescribed in the regulations as certain areas like staircases, lifts, balconies etc. are exempted for FSI computation. For comparison therefore the regulatory FSIs were enhanced by 22% to account for areas otherwise not computed for FSI. (e.g. FSI 1.8 prescribed in regulation was considered equivalent to 2.2 for present study). The plots were then classified according to utilization of FSI. "Low consumption of FSI i.e. less than 45% of FSI", "medium consumption of FSI between 45% and 85% of FSI" and "high consumption over 85% of FSI". Land related to unconsumed FSI was considered as marketable land.

(e) However the value of such land cannot be realized unless the existing buildings are reorganized and reconstructed. The net value of land was therefore arrived at by deducting the cost of reorganizing and reconstructing the existing structures from the value of land related to unconsumed FSI. In cases of high consumption of FSI the net value came to be negative and was treated as zero (or non-marketable)[16].

Alternative 2 - Based on residual plot area

In this case the residual plot area is calculated by deducting the building footprint area(s) from the plot area. If the residual plot is more than 50% of the total plot area the residual is considered as potentially marketable land. This scenario is meant to represent the potential for releasing excess land were there is scope for relaxing what may be excessive plot coverage and setback regulations for certain neighborhoods and land uses. A recent study of Ahmedabad's real estate market has shown that these regulations applying unrealistically and unnecessarily high standards uniformly throughout the city can drive excessive land consumption without necessarily achieving their goals

[16] Demolition costs were assumed to be zero since demolition contractors in Ahmedabad can sell the materials recovered from demolition and therefore do the work for no charge. Reconstruction costs were estimated at Rs. 25,000 per square meter.

of lowering densities[17]. While it may not be possible or desirable to reconfigure all such plots so identified, the scenario of valuing the excess land in plots over 1 hectare in size with only 50 percent of plot coverage offers some indication of the potential additional land value that could be realized with selective relaxation of what can be excessive regulation.

2.8 Valuation of Potentially Marketable Public Land

The basic source of data for land values are the Jantri rates. These are the values assessed and published by the Government authorities for the purposes of Stamp Duty levied at the time of transaction in land or property. Jantri includes assessed values of (i) vacant land; (ii) built property used for residential use and (iii) built property used for commercial purpose. Out of these, the values for vacant land have been used, as they appear to be the most consistent across different parcels and do not bring in the uncertainty introduced from assessing the value brought about by different types of use. This method leaves out variation that may come about due to differences that may be introduced due to the specific land use and is consistent with our approach of identifying and valuing only public land that is currently not in use or whose use would change.

However, the Jantri rates are known to be lower than the real market values. In order to get an estimate based on the real market values, valuation of three plots in each TPS was obtained from approved assessors. Based on their reports, the difference between the Jantri rate and real market values were calculated as a deviation factor. The estimated market rate is then the Jantri rate multiplied by the deviation factor applied to all plots in a TPS.

The Jantri rates, estimated market values and estimated deviation factors for a sample of five of the TPS covered in the study are presented in Table 5 below.

No.	TPS No. and Name	FP No.	Jantri Rate	Market Rate	Deviation Factor	Multiplier
1	TPS No. 56 - Sola Gota Oganaj	229	10,000	15,000	1.50	1.51
2	TPS No. 56 - Sola Gota Oganaj	239	10,000	15,000	1.50	
3	TPS No. 56 - Sola Gota Oganaj	281	16,500	25,000	1.52	
4	TPS No. 43 - Sola	40	14,000	65,000	4.64	2.84
5	TPS No. 43 - Sola	221/1	9,500	10,000	1.05	
6	TPS No. 43 - Sola	209	16,000	45,000	2.81	
7	TPS No. 28 - Ghatlodia	81	12,500	20,000	1.60	2.40
8	TPS No. 28 - Ghatlodia	68	12,500	20,000	1.60	
9	TPS No. 28 - Ghatlodia	106	12,500	50,000	4.00	
10	TPS No. 29 - Chandlodia Sola	62	14,250	60,000	4.21	2.45
11	TPS No. 29 - Chandlodia Sola	82	12,750	20,000	1.57	
12	TPS No. 29 - Chandlodia Sola	73	12,750	20,000	1.57	
13	TPS No. 30 - Gota	119	15,000	20,000	1.33	1.38
14	TPS No. 30 - Gota	120	15,000	20,000	1.33	

[17] Annez et alia 2012 op cit.

15	TPS No. 30 - Gota	134	13,500	20,000	1.48	

Table 5: Jantri Rates and Market Rate Multipliers

Figure 12 and Figure 13 show how Jantri Rates and Market Rates vary with the distance from the CBD respectively.

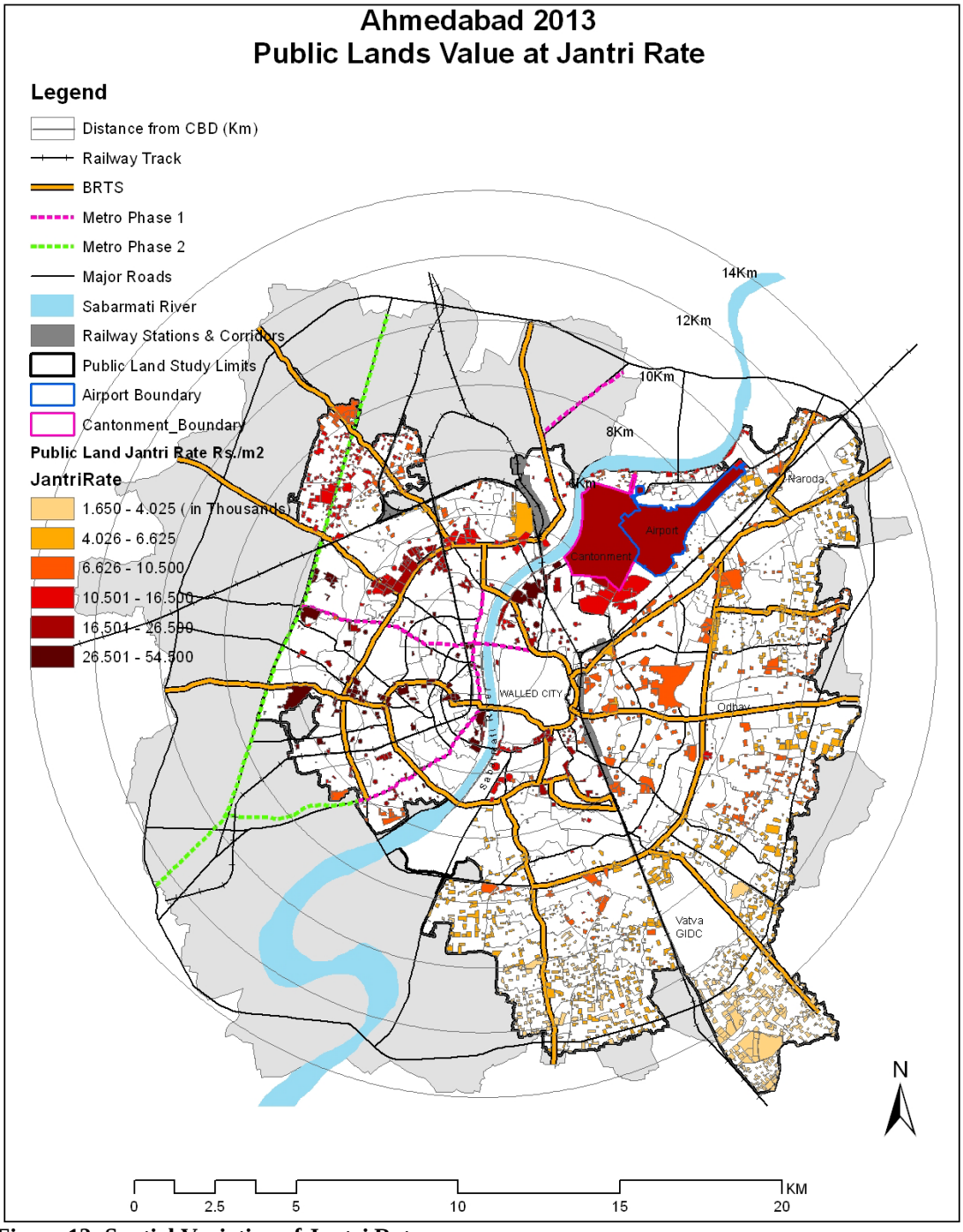


Figure 12: Spatial Variation of Jantri Rates

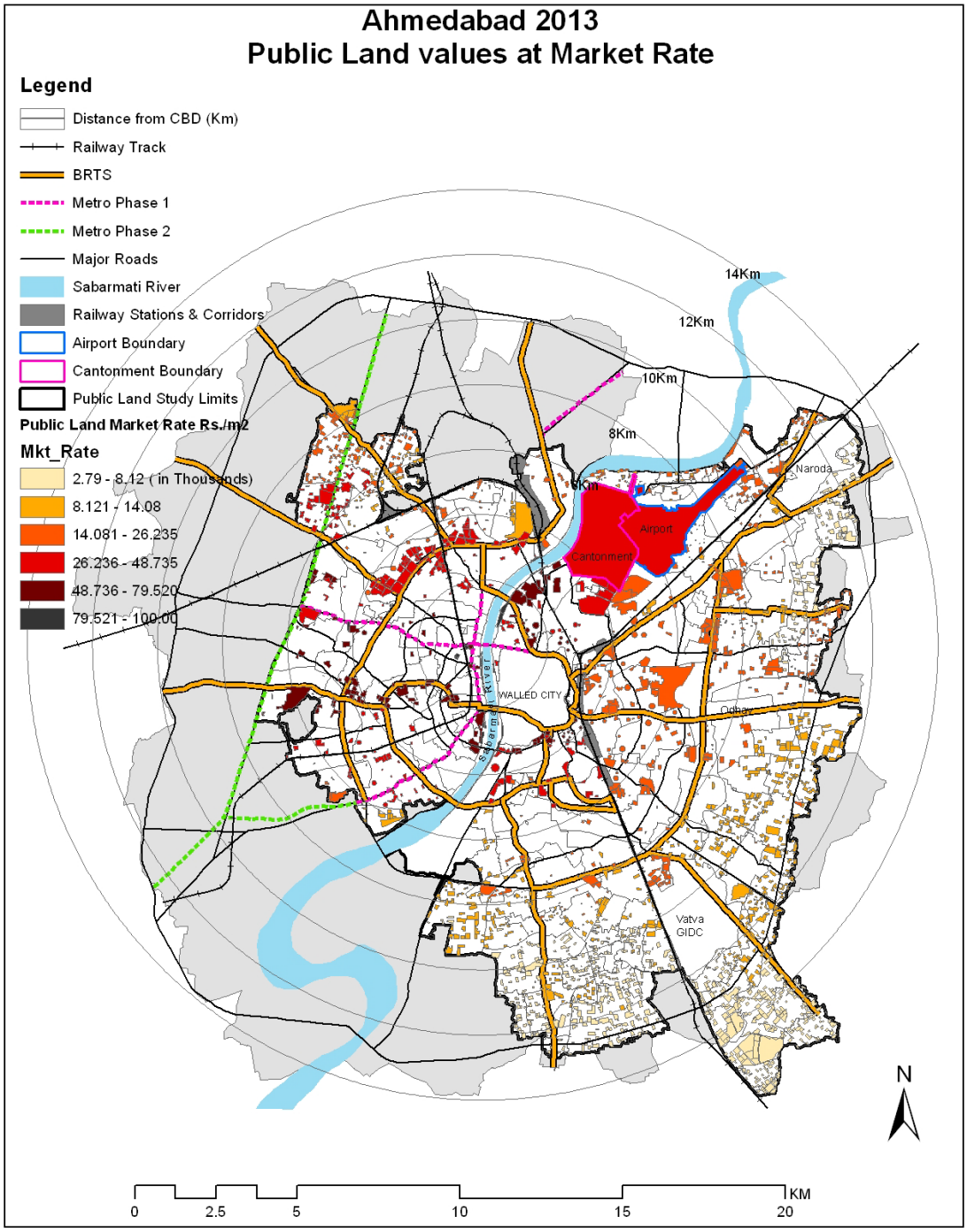


Figure 13: Spatial Variation of Market Rates

The land values using Jantri and Market Rates vary greatly, between Rs. 1650 to Rs.54,500 per square meter (Figure 12 - Jantri Rate) and Rs. 2750 to Rs. 100,000 per square meter (Figure 13 - Market Rate). Both maps show that the most valuable parcels are along the bank of the Sabarmati River called **"Riverfront"**, where the land was evaluated at Rs. 54,500 per m2 by Jantri rate and Rs. 100,000 per m2 by Market rate.

Other high value parcels are next to the City center (2 to 4 km distance from the CBD) and in the North of Ahmedabad (from 6 to 8 km from the CBD). The market values in these areas vary from Rupees 26,000 to 80,000 per square

meter.

The market value of land parcels within the University Campus is close to Rupees 50,000 per square meter

For the Cantonment (484 ha) and the Airport (403 ha) the land market value was estimated at Rupees 40,000 per square meter. These two valuable land areas are preventing the extension of the city core in the Northern part of the city. The Cantonment estate, located between kilometer 4 and 6 particularly, is underutilized and may at one point be considered for redevelopment. (See in Annex I a Google Earth image of the area).

Most of the not-so-valuable land is in the Eastern and Southern parts of Ahmedabad. The market prices for these parcels vary between Rupees 3,000 to 15,000 per square meter. It should also be noted that in the very South the parcels are smaller in sizes (0.5 to maximum 2.5 hectares). The parcels derive mostly from the TPS land appropriations regulations.

Along the BRTS corridor in the South and Eastern part of Ahmedabad the land values are still in the low range, Rs. 2,800 to 9,000 per m2.

The Metro Lines (Phases 1 and 2), not immediately planned, in the Western part of Ahmedabad, may have some impact on land values in the future. The areas more affected will be the former Greenbelt area localized next the Phase 2 Metro corridor.

The four estimations, Alternative I (a) and (b) and Alternative II (a) and (b), for the valuations of potentially marketable public land at Jantri and Market Rates are presented below in Table 6 and Table 7.

INVENTORY OF PUBLIC LANDS - AHMEDABAD

VALUTION OF MARKETABLE LANDS -ALTERNATIVE I

Alternative I (a): Unused FSI at Jantri Rates

Category	Municipal Corporation	State Government	Central Government	Total Rs. in Crores	% of Total
Public land incl. TPS Appropriations	8,082	1,961	34	10,078	49.21%
20% of Green Belt lands	1,378	0	0	1,378	6.73%
Obsolete use	415	0	0	415	2.03%
Consumed FSI <45%	1,023	2,070	231	3,324	16.23%
45%<Consumed FSI <85%	0	0	0	0	0.00%
Consumed FSI >85%	0	0	0	0	0.00%
Airport	0	0	694	694	694
Cantonment	0	0	4,590	4,590	4,590
Total	**10,898**	**4,031**	**5,549**	**20,478**	**100.00%**
% of Total	*53%*	*20%*	*27%*	*100%*	

Alternative I (b): Unused FSI at Market Rates

Category	Municipal Corporation	State Government	Central Government	Total Rs. in Crores	% of Total
Public land incl. TPS Appropriations	16,110	3,798	66	19,974	45.78%
20% of Green Belt lands	2,142	0	0	2,142	4.91%
Obsolete use	830	0	0	830	1.90%
Consumed FSI <45%	3,372	5,974	755	10,101	23.15%
45%<Consumed FSI <85%	15	1	0	16	0.04%
Consumed FSI >85%	0	0	0	0	0.00%
Aiport	0	0	1,387	1,387	1,387
Cantonment	0	0	9,180	9,180	9,180
Total	**22,469**	**9,773**	**11,388**	**43,630**	**100.00%**
% of Total	*51%*	*22%*	*26%*	*100%*	

Table 6: Alternative I - Valuation of Public Land

INVENTORY OF PUBLIC LANDS - AHMEDABAD

VALUTION OF POTENTIALLY MARKETABLE LANDS ALTERNATIVE II

Alternative II (a): Available Land at Jantri Rates

Category	Municipal Corporation	State Government	Central Government	Total Rs. in Crores	% of Total
Public land incl. TPS Appropriations	8,082	1,961	34	10,078	36.08%
20% of Green Belt lands	1,378	0	0	1,378	4.93%
Obsolete use	297	0	0	297	1.06%
Consumed FSI <45%	2,593	5,436	598	8,626	30.89%
45%<Consumed FSI <85%	544	889	20	1,454	5.20%
Consumed FSI >85%	225	586	4	814	2.91%
Airport	0	0	694	694	2.48%
Cantonment	0	0	4,590	4,590	16.43%
Total	**13,118**	**8,872**	**5,940**	**27,930**	**100.00%**
% of Total	*47%*	*32%*	*21%*	*100%*	

Alternative II (b): Available Land at Market Rates

Category	Municipal Corporation	State Government	Central Government	Total Rs. in Crores	% of Total
Public land incl. TPS Appropriations	16,110	3,798	66	19,974	36.62%
20% of Green Belt lands	2,142	0	0	2,142	3.93%
Obsolete use	593	0	0	593	1.09%
Consumed FSI <45%	5,327	10,421	1,168	16,916	31.02%
45%<Consumed FSI <85%	1,098	1,644	43	2,785	5.11%
Consumed FSI >85%	371	1,185	6	1,562	2.86%
Aiport	0	0	1,387	1,387	2.54%
Cantonment	0	0	9,180	9,180	9,180
Total	**25,640**	**17,048**	**11,851**	**54,539**	**100.00%**
% of Total	*47%*	*31%*	*22%*	*100%*	

Table 7: Alternative II – Valuation of Public Land

***Please note that one crore rupees is equal to 10 million rupees, or about USD 180,000 at the rate of INR 55 per USD**

According to Alternative I (a) valuation of public land is Rs. 20,478 Crores at Jantri rates. At Market Rates – Alternative I (b) the valuation is Rs. 43,630 Crores. According to Alternative II (a) valuation of public land is Rs. 27,930 Crores at Jantri rates. At Market Rates – Alternative II (b) the valuation is Rs. 54,539 Crores.

3 Conclusions: Significance of Revenue Potential

The financial resources that could be generated by monetizing public land range between Rs. 20,000 Crores and Rs. 54000 Crores (about 3.6 billion and 9.8 billion USD, respectively).[18] The population of AMC (the expanded jurisdiction as of 2006) is 5,570,585. This implies per capita availability of fiscal resources amounting to Rs. 36000 to Rs. 97000 (about USD 700 and 1800, respectively)[19]. The amounts involved may be compared to investment requirements for urban infrastructure—a well-recognized government investment priority. HPEC at 2009-10 prices had estimated the per capita investment cost of Rs. 43386 for the entire range of physical urban infrastructure for the next twenty years.[20] The significance of the value of potentially marketable public land, at 82 percent of this requirement in the low case, and more than double this requirement in the high case can readily be appreciated in this context.

AMC in 2005 had prepared a City Development Plan under Jawaharlal Nehru National Urban Renewal Mission (JnNURM). The capital investment needs projected in the plan for a seven-year period were about Rs.9000 crores. The minimum value of public land is over twice this estimate. Thus study thus clearly demonstrates that monetizing public land could significantly contribute to investments in infrastructure and other high priority government goals.

4 Conclusions: Further Applications

Unlocking the value of public land has been recognized as a potentially highly significant source of finance for urban infrastructure. The present study is the

[18] Since potentially marketable public lands amount to about 15 percent of total developable land, releasing all these lands on the market at the same time could depress equilibrium prices and thus lower these estimates. However such a rapid release of lands both unlikely to be feasible and is perfectly avoidable with proper management of these valuable investments.

[19] The per capita measure of availability is conservative in that the population of the expanded AMC is considerably larger than the old AMC which is our study area. Due to the jurisdictional expansion prior to the most recent census in 2011, we do not have recent population data for the old AMC. The numbers are nonetheless very substantial when compared to GDP per capita at factor cost of about USD1200 in 2011-2012 using a USD exchange rate of 55.

[20] HPEC Table 3.2 *op.cit.*

first of its kind— systematically inventorying public land and estimating its value using GIS and land records. The methodology developed in the study could be used in conjunction with planning for land use, transport and financing of infrastructure. The information here on market values, location and ownership types and the significance of public land on total availability of buildable land could add considerably to the usefulness of current records of land holdings in the hands of various government agencies such as the AMC, the Revenue Department and Central Agencies owning land in the city.

The task required gathering of information, consulting the agencies in charge to obtain existing maps and documents related to Town Planning Schemes and Cadastral Records. Attributes from these documents constituted the database needed for the GIS application. This substantial task was conducted over a period of eight months and involved professionals in the fields of urban planning, GIS technicians, cartographers and land assessors. It is important to note that the GIS database was not the end in itself but it helped to analyze and build scenarios to aid the decision makers in framing their policies for public land asset management and future development.

In the present exercise, land use zoning and FSI as prescribed in the Development Plan 2002 were taken as given. It could be promising to revisit these aspects with alternative land use scenarios. AUDA has published the Draft Development Plan 2012 for public consultation. Since this happened after most of the technical work was completed, the proposals of the Draft Development Plan could not be taken into account. Once the plan is approved, new valuations could be developed. Furthermore, revising land use and FSI regulations in the context of raising resources for infrastructure investments through monetizing public land after due public consultation and consideration of environmental and social issues could be a sound policy. Oftentimes public land is identified as surplus precisely because the current use is out of date. The first and best use of the land freed up can be quite different. Especially when a large well located urban parcel is freed up, a multiplicity of objectives, fiscal, environmental and social can be served. Other countries do follow such an approach and McIvor (forthcoming) offers examples of how this has been done in Canadian cities[21].

Although Central Government, State Government and the Ahmedabad Municipal Corporation are identified as the three land-owning public agencies, within each of these there are many authorities that are in possession of land and decide use of land. Within Central Government, the Ministry of Defense is involved in case of Cantonment; the Ministry of Civil Aviation is involved in Airport etc. In case of State Government too there are various departments such as Food and Civil Supplies Department in case of warehouses for food grains, the Home

[21] Gordon McIvor Urban Land Development And The Monetization Of Land Assets In Cities Canada Lands Company: A Canadian Success Story forthcoming World Bank

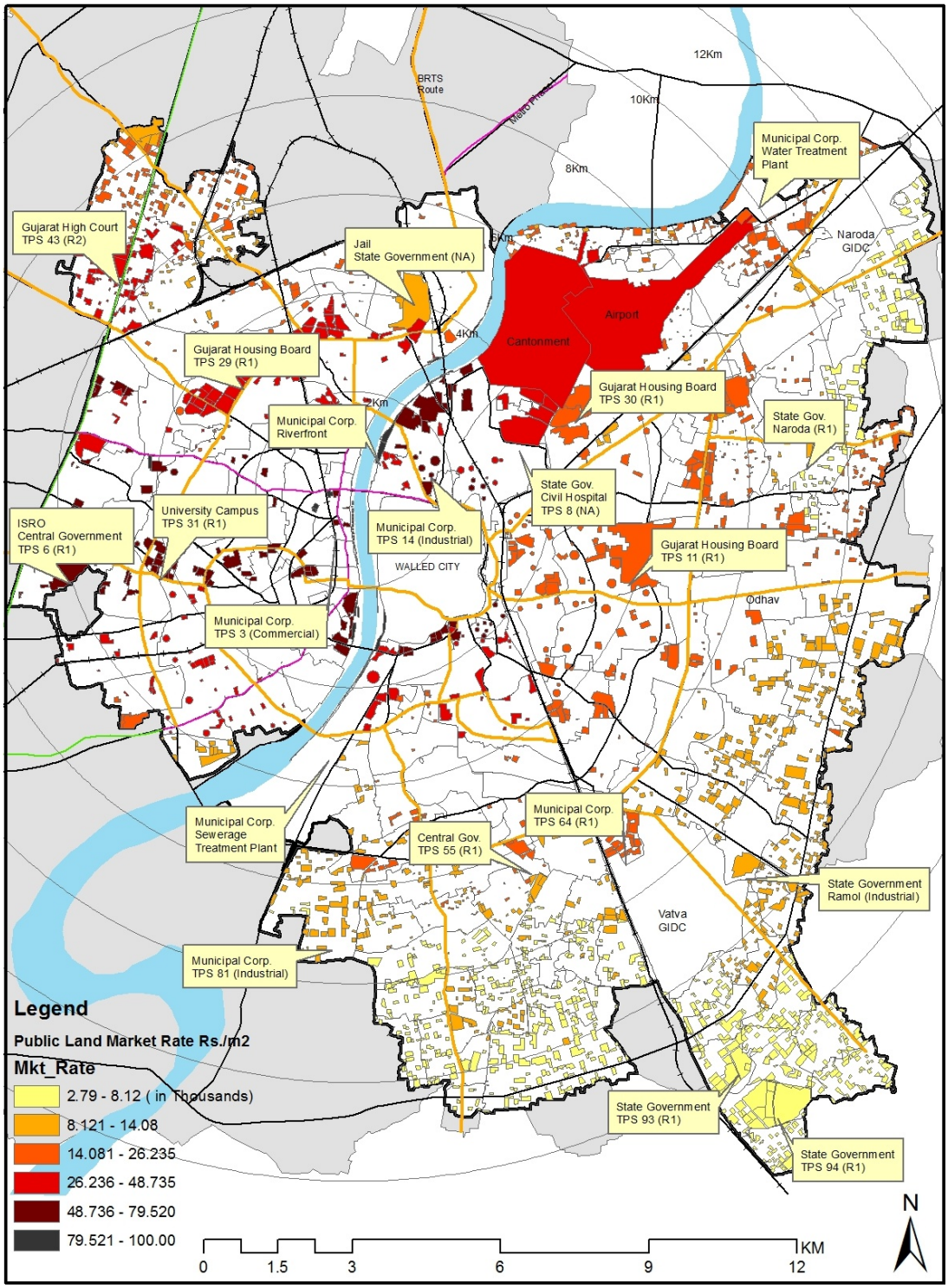
Department for police stations and police housing, jails and narcotics stores etc. Each of these authorities possesses this land without any compulsion or obligation for optimal utilization of the land. Consequently data are not readily available to develop well informed policies and programs for monetizing excess land and adapting public use to current needs.

Similar studies should be replicated in other cities. Where cities do not have TPS, the maps and databases could be developed from other sources, such as the basic cadasters. (e.g., village maps, city survey maps and relevant extracts of record of rights). This will have to be followed by creating a mosaic of digitized vector maps corrected with reference to geocoded satellite images and then attribute data can be developed in GIS. To accomplish this, a team that is competent in interpreting cadasters and using analytical capabilities of GIS would be necessary. However such a study can be replicated whenever access to ownership records is available on a consistent basis. Such a requirement should be possible to meet in other cities.

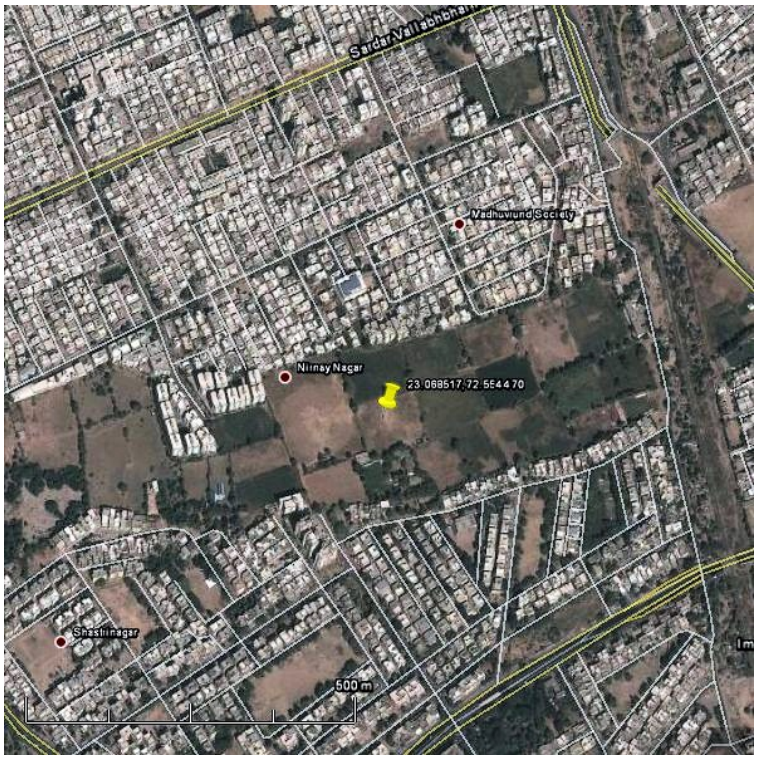
This study fairly conclusively demonstrated that unlocking the value of public land could be a significant fiscal contribution to investment in urban infrastructure. Not only is excess public land highly valuable, but this study also shows that aggregate public land holdings have a substantial footprint—amounting to 32 percent of total buildable space even in a city such as Ahmedabad, which is known more for its vibrant private sector than its large government presence.

ANNEX I

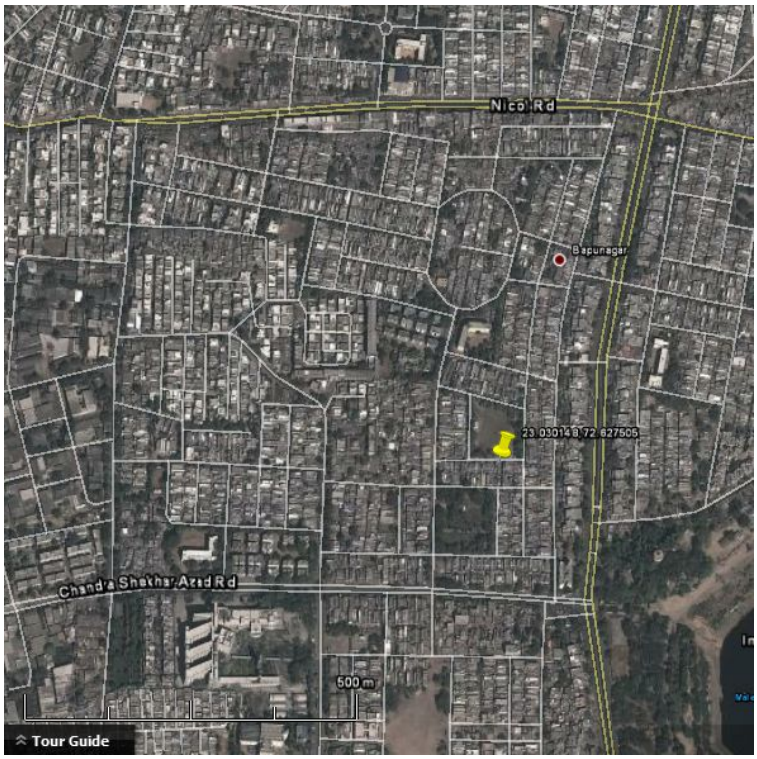
Public Land Market Rate and Sites Localized in Google Earth



Ahmedabad Sites localization visited in Google Earth (6 of these sites are printed below).

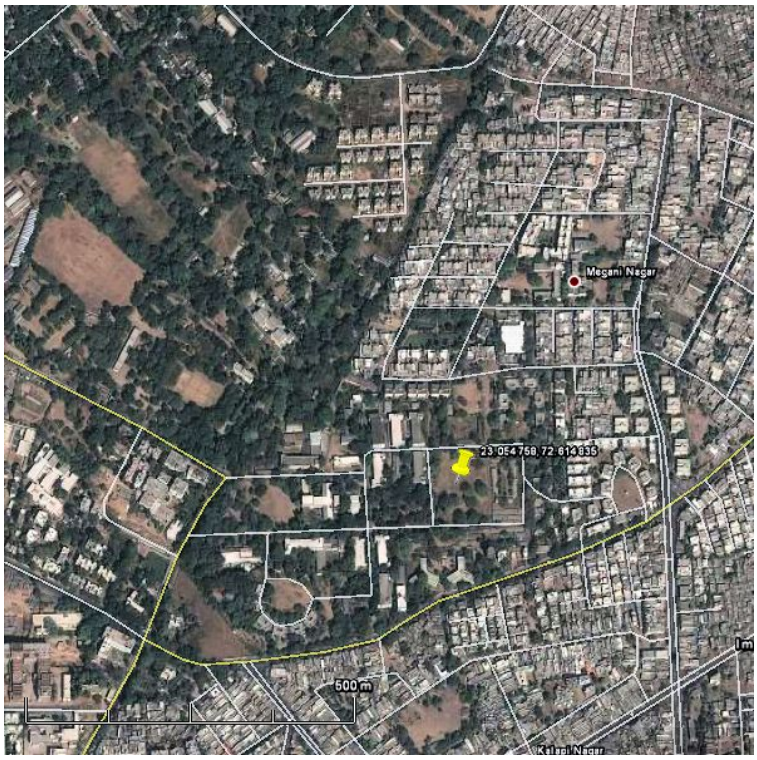


Gujarat Housing Board, Green Belt – TPS 29 (R1) Lat.23.068517 Lon.72.554470



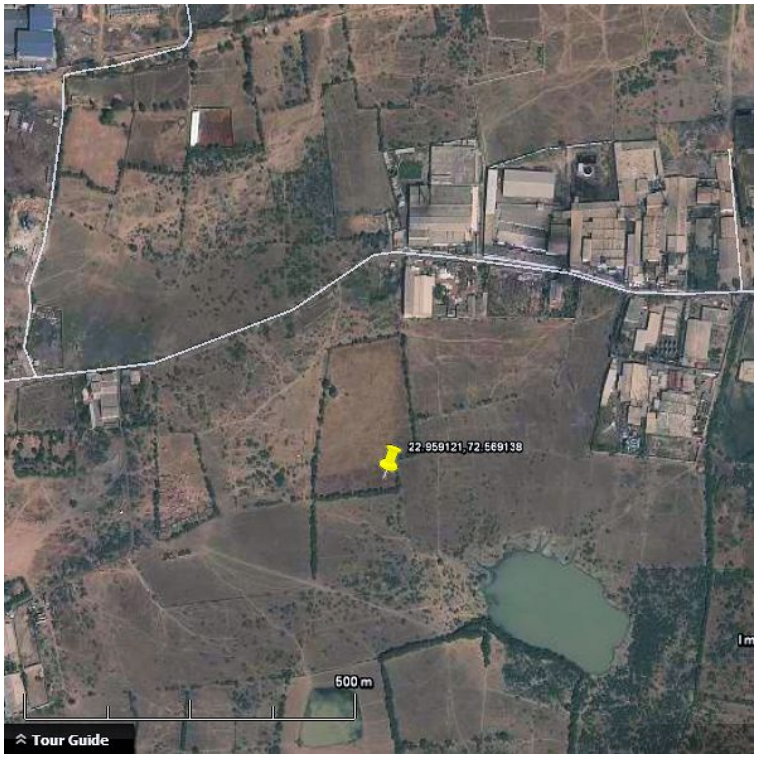
Gujarat Housing Board – TPS 11 (R1) Lat.23.030148 Lon.72.627505

State Government – TPS 43 (R2) Lat. 23.080387 Lon.72.521018



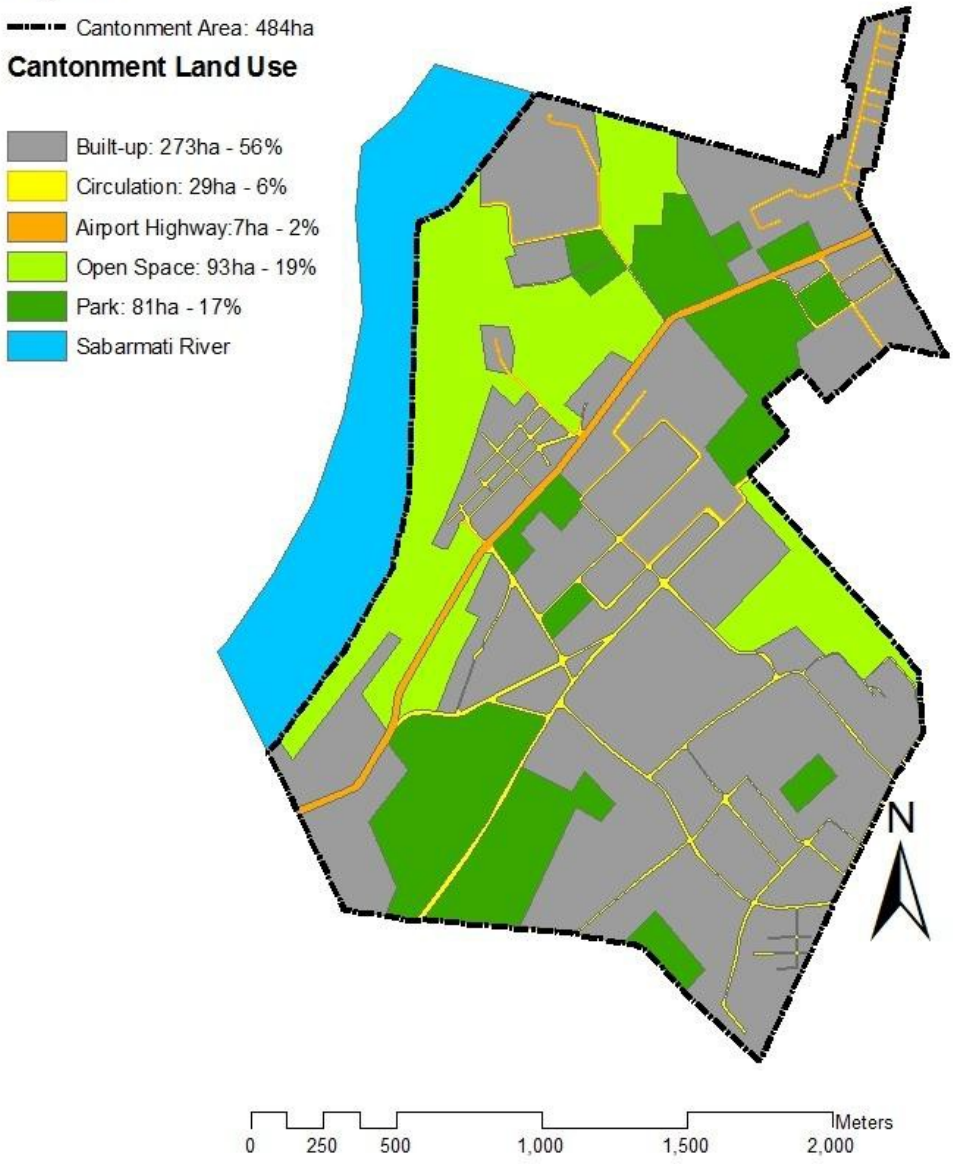
State Government – TPS 66 (R1) Lat.23.054758 Lon.72.614835

Municipal Corporation – (Riverfront) Lat. 23.051142 Lon.72.578694



Municipal Corporation – TPS 81 (Industry) Lat.22.959121 Lon.72.569138

Ahmedabad 2013
Cantonment Land use



ANNEX II

GIS SHAPE FILE DATABASE "FP_Boundary" FIELD LISTING

No	Field	Description
1	No.	Unique Serial Number in the database table
2	Unique _ID	Unique ID generated in GIS
3	Owner	Name of the owner
4	Ownership	Central Government, State Government, Municipal Corporation
5	TPS_Village	TP Scheme No. or Village name in no TPS areas
6	FP_No	Unique Final Plot Number in a given TPS
7	Plot _Area	Plot Area in square meter.
8	DP_Zone	Land use zone as indicated in the Development Plan (e.g. R1, R2)
9	Type	**Land use type abbreviations:** RES = Residential COM = Commercial IND = Industrial General & Industrial Special INS = Institutions: Education, Health, University, Research PK = Park, Garden, Open Space, Agriculture, Forest W = Water Body, River, Canal CEM = Cemetery UTL = Utilities, Treatment Plant, Power Station AIR = Airport CAN = Cantonment SER = Market, Bus Stand, Parking, Transport Node WMK = Wholesale market OTH = Multipurpose NA = No Special Assignment
10	Bldg_Footp	Building(s) footprint(s)total area for the specific plot
11	Floor_Area	Total building(s) floor area for the specific plot
12	FSI	Permitted **F**loor **S**pace **I**ndex including an allowance for areas not computed for
13	Exist_FSI	Building total floor area(s) divided by the specific plot area
14	Category	**Category: Non Marketable & Marketable Land** 5.1a = Road & Railway 5.1.b= Water Body 5.1.c= Graveyard 5.1.d= Garden/Open Space 5.1.e= Heritage Parcel 5.1.f = Slums 5.1.g= Utilities/Industrial Estate 6.1.a = Vacant plot 6.2.a = Plot under obsolete use 6.2.b = Plot consuming less than 45% of FSI 6.2.c = Plot consuming 45% to 85% of FSI 6.2.d = Plot consuming more than 85% of FSI 6.2.e = Plot under special use
15	Jantri_Rate	Jantri land value m2 determined by the government authorities for Stamp
16	Mkt_Rate	Market land value per m2 assessed as multiple of Jantri rate based on the
17	Remark	Information concerning the specific plot.
18	Balance FSI	Permitted FSI minus Existing FSI.
19	Balance Floor Area	Balance FSI (difference between permitted FSI and Existing FSI) multiplied by
20	Land Equivalence	Balance floor area divided by permitted FSI.
21	Jantri Value Alternative 1a	Balance FSI land evaluated at Jantri rate
22	Market Value Alternative 1b	Balance FSI land evaluated at Market rate
23	Residual Land Area Percent	For plot with existing building the residual land area is equal to the "**Plot_Area"**
24	Jantri Value Alternative 2a	"**Residual Area**" more than 70% of the "Plot **Area**" multiplied by "**Jantri Rate**"
25	Market Value Alternative 2b	"**Residual Area**" more than 70% of the "Plot **Area**" multiplied by "**Market Rate**"

Note: Cells in gray are for data entered in the GIS database "TP_Boundary". Others are resulting data calculated in an Excel spreadsheet.